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Methodological article (Technical Note)

Impressive closure of a sustaining periprosthetic endoleak (type II) using fibrin glue application after former endovascular placement of an infrarenal aortic prosthesis

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The management of a postinterventional endoleak after the endovascular repair of an aortic aneurysm is still a relevant problem through the patient's postinterventional course. There are four types of endoleaks due to: (I) incomplete exclusion of the aneurysm; (II) retrograde filling of the aneurysmatic sac via the arteries originating from it; (III) defect of the endoprosthesis or dislocation of the endoprosthetic segments; and (IV) blood flow

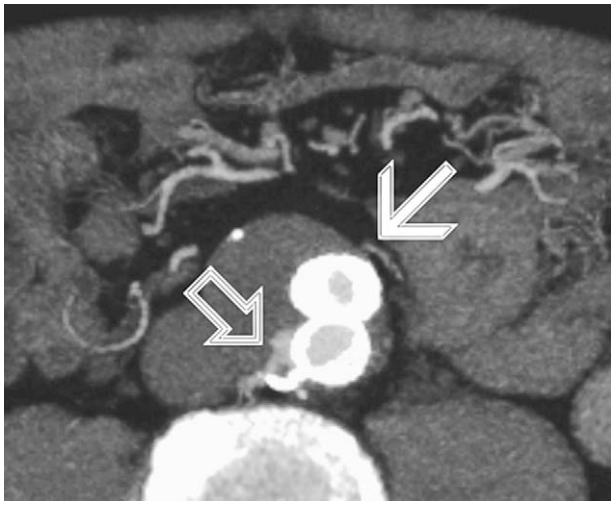

Fig. 1. CT scan after endovascular insertion of the infrarenal aortic prosthesis in arterial timing allowing high-resolution acquisition images using a 16-slice scanner (Aquilion 16, Toshiba, Nasu, Japan) after iv application of contrast media: maximum intensity projection of transversal abdominal slices of the lower abdomen. It reveals the periprosthetic collection of bloody fluids indicating a sustaining endoleak type II (thick arrow) provided by open estuaries of the lumbal arteries and inferior mesenteric artery (thin arrow).

Fig. 2. Diagnostic DSA of a superior mesenteric artery branch via microcatheter (2.7 F; Microferrit, Cook, Bjaeverskov, Denmark): elongation of Riolan's anastomosis did not allow a successful vascular access for coil embolization.

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through the artificial wall material of the stent graft. For the infrarenal site of the aortic aneurysm, endovascular repair using endoprosthesis inserted via the femoral artery has been established in patients with: (i) an infrarenal aortic segment of a diameter within normal range and length of minimally 1.5 cm to anchor the prosthesis; and (ii) high risk factors.

Here, we report on an extraordinary case and the unconventional management of a sustaining long-term periprosthetic type II endoleak after former endovascular repair of an infrarenal aneurysm, which is shown to demonstrate feasibility and good prospects of this kind of interventional radiological approach.

An 80-year old patient was transferred because of an infrarenal aortic aneurysm (diameter, 5 cm), which was treated using an endovascular approach to insert an infrarenal aortic prosthesis via the right/left transfemoral access because of the medical history significant for severe comorbid conditions such as arterial hypertension, non-insulin dependent diabetes mellitus (type II), heart insufficiency stage III according to NYHA classification and insufficiency of the aortic valve. This was classified as stage III according to the ASA score. The patient tolerated the intervention well, the postinterventional course was uneventful. According to the institutional follow-up investigation protocol, the patient underwent control imaging every 3 months through the first postinterventional year. At the first control investigation, an endoleak within the periprosthetic space still inside of the natural wall of the former aortic aneurysm was found (type II). The fluid volume was sustained by blood influx from the lumbal arteries and the inferior mesenteric artery. Further controls including periodic clinical examen repeatingly showed a sustained liquid edge periprosthetically (thickness, 6–7 mm) (Fig. 1). Therefore, after a total of 14 months postinterventionally, it was transfemorally approached from the right side attempting an embolization of the estuaries of the lumbal arteries and inferior mesenteric artery with coils, which was not successful. Elongation of Riolan's anastomosis did not allow a successful vascular access for embolization (Fig. 2). Subsequently, after a further 2 days, the patient underwent the DSA-guided direct puncture of the periprosthetic fluid collection and

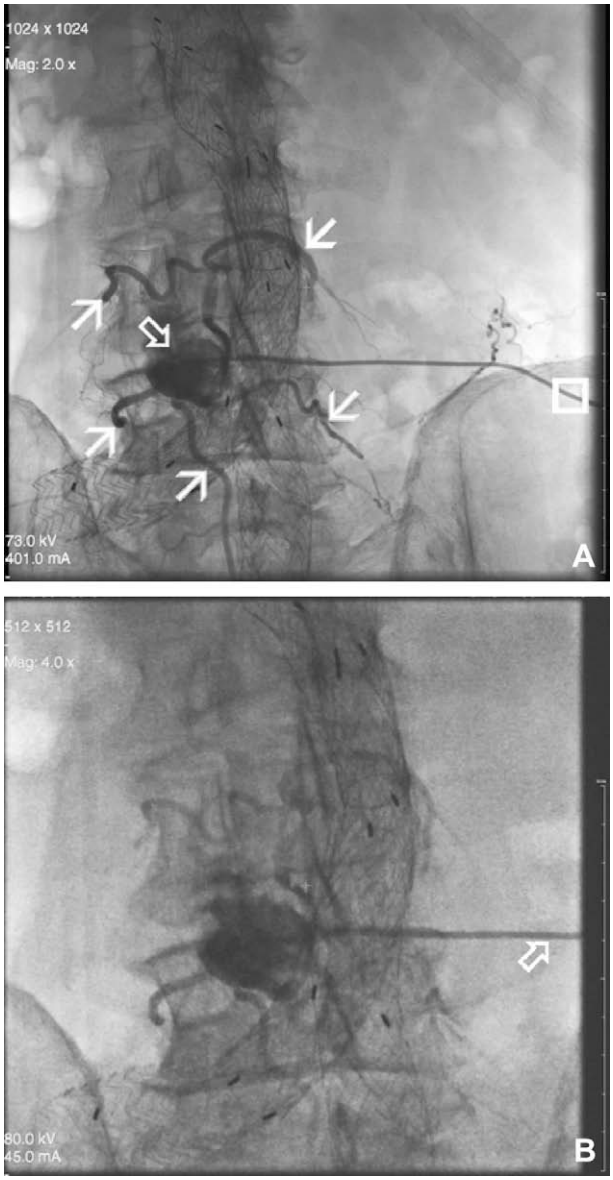

Fig. 3. DSA control during radiological intervention: (A) directly punctured endoleak of type II (thick arrow) with 4F-MP catheter and subsequent image of the vascular system of lumbal arteries (thin arrow). 4F-angiography catheter was introduced after direct puncture (square). (B) Application of occlusion emulsion (Ethibloc®; Johnson + Johnson, St-Steves-Woluwe, Belgium) supplemented with lipiodol ultra-fluid (Gubert, Roissy CdG Cedex, France) for better visualization by mean of direct puncture via 4F-Katheter (thick arrow).

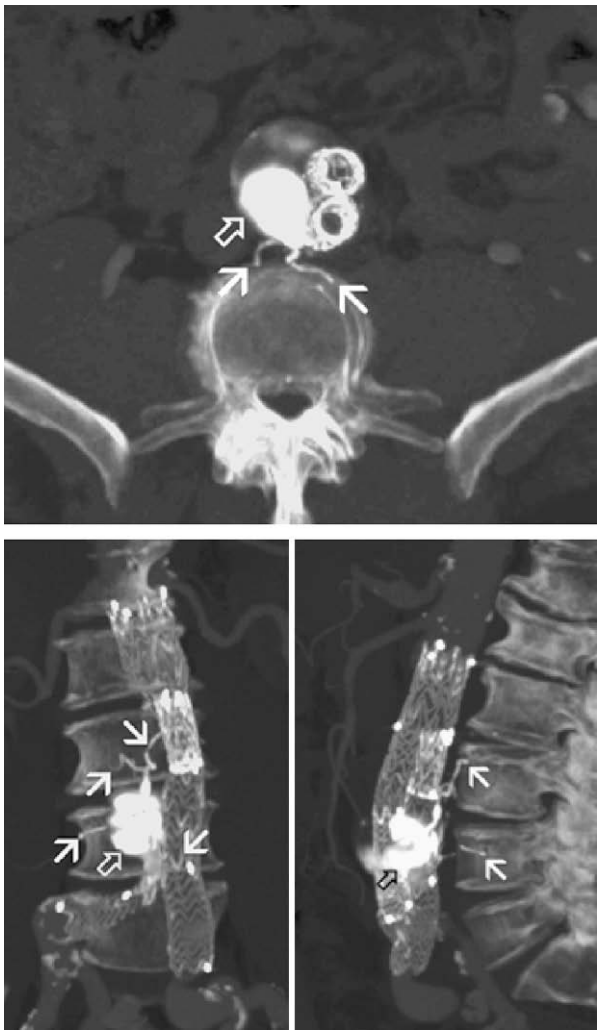

Fig. 4. Non-enhanced CT-based reconstructions (upper panel, transversal image; lower panels, saggital images from the right and the left) in maximum intensity projection as postinterventional control of direct embolization of endoleak (type II): high density of occlusion emulsion supplemented with lipiodol in the endoleak (thick arrow) and all lumbal arteries. Note the abruption of occlusion emulsion in lumbal arteries after 1–2 cm.

following the application of 4 ml of an occlusion emulsion (Ethibloc®; Johnson + Johnson, St. Steves-Woluwe, Belgium) supplemented with 1 ml of lipiodol ultra-fluid (Gubert, Roissy CdG Cedex, France) for better visualization onto the estuaries of the four lumbal arteries leading to an immediate and persistent cessation of blood perfusion out of the lumbal arteries (Fig. 3A,B). The long-term occlusion of lumbal arteries was confirmed with a postinterventional control image using non-enhanced CT scan (Fig. 4).

Periprosthetic fluid collection is considered a serious condition after endovascular placement of a prosthesis into the aneurysmatic enlargement of the infrarenal aortic segment, which needs to be followed with control imaging. It was shown under these circumstances as one of the first times that local application of occlusion emulsion directly: (i) into the sac containing the periprosthetic fluid; and (ii) at the opening of the lumbal arteries resulted in a sufficient cessation of the bloody supply from the main surrounding vessels such as the lumbal arteries. This approach can be recommended as feasible and safe in experienced hands to avoid the far more traumatic open surgery including the need for further control images and clinical follow-up.[1,2]

Conflict of interest
None declared

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